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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,886	12/08/2003	Kia Silverbrook	ZE008US	9657
24011	7590	09/08/2004	EXAMINER	
SILVERBROOK RESEARCH PTY LTD			DO, AN H	
393 DARLING STREET			ART UNIT	
BALMAIN, 2041			PAPER NUMBER	
AUSTRALIA			2853	

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/728,886	Applicant(s) SILVERBROOK ET AL.	
	Examiner An H. Do	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4 and 10 is/are rejected.
- 7) ☒ Claim(s) 2, 3 and 5-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/112,806.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/12/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/112,806, filed on 10 July 1998.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 12 December 2003 was filed and is being considered by the examiner.

Specification

3. The disclosure is objected to because of the following informalities: incomplete phase in specification on page 1 line 1 after "November 23, 2002" should include the following:

" , now U.S. Patent No. 6,672,708, which is a Continuation of 09/855,093 filed 05/14/2001, now U.S. Patent No. 6,505,912, which is Continuation of 09/112,806 filed 07/10/1998, now U.S. Patent No. 6,247,790."

Appropriate correction is required.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225

USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1 and 4-10 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims1-7 of copending Application No. 10/728,921. Although the conflicting claims are not identical, they are not patentably distinct from each other because both the instant application and copending Application No. 10/728,921 claim the same subject matter as a micro-electromechanical fluid ejection device having the same structure as shown in the following Claim Comparison Table:

Art Unit: 2853**U.S. Application No. 10/728,886 CLAIMS**

1. A micro-electromechanical fluid ejection device that comprises a substrate that defines a plurality of fluid supply channels and a plurality of chambers in fluid communication with respective fluid supply channels; a drive circuitry layer that is positioned on the substrate; a plurality of roof structures that are connected to the drive circuitry layer to cover respective fluid chambers, each roof structure defining a fluid ejection port; and a plurality of actuators that are connected to the drive circuitry layer and are operatively positioned at respective chambers to eject fluid from the fluid ejection ports on receipt of an electrical signal from the drive circuitry layer, wherein the substrate defines chamber walls that diverge from respective ink inlet channels to respective roof structures.

4. A micro-electromechanical fluid ejection device as claimed in claim 1, in which at least one of the actuators is operatively positioned in each roof structure, each actuator being electrically connected to the drive circuitry layer to be displaceable into and out of its respective chamber, on receipt of said electrical signal, to eject a drop of fluid from the fluid ejection port.

5. A micro-electromechanical fluid ejection device as claimed in claim 4, in which a number of actuators are positioned in each roof structure about the ink ejection port.

6. A micro-electromechanical fluid ejection device as claimed in claim 5, in which each actuator includes an actuator arm that is connected to the drive circuitry layer and extends towards the fluid ejection port, a heating circuit being embedded in the actuator arm to receive the electrical signal from the drive circuitry layer, the actuator arm being of a material that has a coefficient of thermal expansion sufficient to permit the material to perform work as a result of thermal expansion and contraction, the heating circuit being positioned so that the actuator arm is subjected to differential thermal expansion and contraction to displace the actuator arm towards and away from the respective fluid supply channel.

7. A micro-electromechanical fluid ejection device as claimed in claim 6, in which each actuator arm is of polytetrafluoroethylene while each heating circuit is one of the materials in a group including gold and copper.

8. A micro-electromechanical fluid ejection device as claimed in claim 6, in which each actuator arm includes an actuating portion that is connected to the drive circuitry layer and a fluid displacement member that is positioned on the actuating portion to extend towards the fluid ejection port.

9. A micro-electromechanical fluid ejection device as claimed in claim 6, in which each roof structure includes a rim that defines the fluid ejection port, the rim being supported above the respective fluid inlet channel with support arms that extend from the rim to the drive circuitry layer, the actuator arms being interposed between consecutive support arms.

10. A micro-electromechanical fluid ejection device as claimed in claim 1, in which the drive circuitry layer is a CMOS layer.

U.S. Application No. 10/728,921 CLAIMS

1. A micro-electromechanical fluid ejection device that comprises a substrate that defines a plurality of fluid supply channels and a plurality of chambers in fluid communication with respective fluid supply channels; a drive circuitry layer that is positioned on the substrate; a plurality of roof structures that are connected to the drive circuitry layer to cover respective fluid chambers, each roof structure defining a fluid ejection port; and at least one actuator that is positioned in each roof structure, each actuator being electrically connected to the drive circuitry layer to be displaceable into and out of its respective chamber to eject a drop of fluid from the fluid ejection port.

2. A micro-electromechanical fluid ejection device as claimed in claim 1, in which a number of actuators are positioned in each roof structure about the ink ejection port.

3. A micro-electromechanical fluid ejection device as claimed in claim 2, in which each actuator includes an actuator arm that is connected to the drive circuitry layer and extends towards the fluid ejection port, a heating circuit being embedded in the actuator arm to receive the electrical signal from the drive circuitry layer, the actuator arm being of a material that has a coefficient of thermal expansion sufficient to permit the material to perform work as a result of thermal expansion and contraction, the heating circuit being positioned so that the actuator arm is subjected to differential thermal expansion and contraction to displace the actuator arm towards and away from the respective fluid supply channel.

4. A micro-electromechanical fluid ejection device as claimed in claim 3, in which each actuator arm is of polytetrafluoroethylene while each heating circuit is one of the materials in a group including gold and copper.

5. A micro-electromechanical fluid ejection device as claimed in claim 3, in which each actuator arm includes an actuating portion that is connected to the drive circuitry layer and a fluid displacement member that is positioned on the actuating portion to extend towards the fluid ejection port.

6. A micro-electromechanical fluid ejection device as claimed in claim 3, in which each roof structure includes a rim that defines the fluid ejection port, the rim being supported above the respective fluid inlet channel with support arms that extend from the rim to the drive circuitry layer, the actuator arms being interposed between consecutive support arms.

7. A micro-electromechanical fluid ejection device as claimed in claim 1, in which the drive circuitry layer is a CMOS layer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Khuri-Yakub et al (US 5,828,394).

Khuri-Yakub et al disclose the following claimed limitations:

Regarding claim 1, a micro-electromechanical fluid ejection device (Figures 1-3, a fluid drop ejector, column 1, lines 44-49) that comprises a substrate (11, 12) that defines a plurality of fluid supply channels (aperture 16) and a plurality of chambers (reservoirs 14) in fluid communication with respective fluid supply channels (aperture 16); a drive circuitry layer (18, 19) that is positioned on the substrate (11, 12); a plurality of roof structures (13, 17) that are connected to the drive circuitry layer to cover respective fluid chambers (reservoirs 14), each roof structure (13, 17) defining a fluid ejection port (the centered orifice); and a plurality of actuators (piezoelectric annular disk 17) that are connected to the drive circuitry layer (18, 19) and are

operatively positioned at respective chambers (14) to eject fluid from the fluid ejection ports (the centered orifices) on receipt of an electrical signal from the drive circuitry layer (Figures 4A-6C), wherein the substrate (11, 12) defines chamber walls (membrane 13) that diverge from respective ink inlet channels to respective roof structures (Figures 7A-7D).

Regarding claim 4, in which at least one of the actuators (piezoelectric annular disk 17) is operatively positioned in each roof structure (13, 17), each actuator (piezoelectric annular disk 17) being electrically connected to the drive circuitry layer (18, 19) to be displaceable into and out of its respective chamber, on receipt of said electrical signal, to eject a drop (27) of fluid from the fluid ejection port (Figures 7A-7C).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Khuri-Yakub et al (US 5,828,394) in view of Asaba (US 5,850,242).

Khuri-Yakub et al disclose the claimed invention except for the limitation of the drive circuitry layer is a CMOS layer.

Asaba teaches in Figure 17 the drive circuitry layer is a CMOS layer (column 1, lines 60-66), for the purpose of supplying a signal for drivingly controlling one transistor at a desired timing (column 4, lines 36-38).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the actuators actuated by means of a thermal actuator device, as taught by Asaba into Khuri-Yakub et al, for the purpose of supplying a signal for drivingly controlling one transistor at a desired timing (column 4, lines 36-38).

Allowable Subject Matter

10. Claims 2, 3 and 5-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the allowance of claims 2 and 3 is the inclusion of the limitation of a micro-electromechanical fluid ejection device that includes chamber walls of each fluid chamber are shaped and oriented to define a four-sided pyramidal structure with an apex that terminates at the respective inlet channel. It is this limitation found in the claims, as it is claimed in the combination of, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 5-9 is the inclusion of the limitation of a micro-electromechanical fluid ejection device that includes a number of actuators that are positioned in each roof structure about the ink ejection port. It is this limitation found in the claims, as it is claimed in the combination of, that has not been

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found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Inui et al (US 5,719,604) disclose a thermal inkjet printhead having a buckling body including a heater layer buckled when a current is applied. Karita et al (US 6,151,049) disclose a liquid discharge head having a flow path including a bubble-generating region in which bubbles are generated, a movable member having a free end on the side of the discharge opening.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to An H. Do whose telephone number is 571-272-2143. The examiner can normally be reached on Monday-Friday (Flexible).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



AD
September 1, 2004

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Primary Exa. 9/6/04